Hodgkin's Lymphoma

This practice algorithm has been specifically developed for MD Anderson using a multidisciplinary approach and taking into consideration circumstances particular to MD Anderson, including the following: MD Anderson's specific patient population; MD Anderson's services and structure; and MD Anderson's clinical information. Moreover, this algorithm is not intended to replace the independent medical or professional judgment of physicians or other health care providers. This algorithm should not be used to treat pregnant women.

NOTE: Consider Clinical Trials as treatment options for eligible patients.

DIAGNOSIS

- FNA alone is insufficient
- Hematopathology review of all slides with at least one tumor paraffin block. Rebiopsy if consult material is non-diagnostic
- Core needle biopsy may be adequate if diagnostic, but an excisional nodal biopsy is recommended
- Recommend staining for CD15, CD30, T and B panels, CD20, PAX5
- Adequate immunophenotype to confirm diagnosis
  - Paraffin panel for Hodgkin's lymphoma (HL) including nodular lymphocyte predominant HL:
    - CD20, PAX-5, CD30, CD3, CD15, and CD45 (LCA)
    - EBER
- EBV proteins (*i.e.*, LMP1) recommended for nodular sclerosis (NS) grade 2 or anaplastic variants

OF USE IN CERTAIN CIRCUMSTANCES

- Immunohistochemical studies:
  - LMP1
  - BOB1, OCT2, and CD79a (differential diagnosis with B-cell lymphoma, unclassifiable with features intermediate between classical HL and DLBCL and primary mediastinal large B-cell lymphoma).
  - CD21, CD23, or CD35 (follicular dendritic cell markers), CD57, BCL6 and IgD in cases of nodular lymphocyte predominant HL (may help with T-cell/histiocyte rich large B-cell lymphoma)
  - CD2, CD43, ALK, and EMA (differential diagnosis with anaplastic large cell lymphoma)

STRONGLY RECOMMEND:

- Core biopsy for tissue banking by protocol

WORKUP

- History and physical including:
  - Alcohol intolerance
  - Pruritus
  - Exam of nodes
  - B symptoms (fever, sweats, weight loss)
  - Performance Status
  - Fatigue
  - Spleen, liver
- CBC, differential, platelets
- LDH, liver function tests (LFTs) including: alkaline phosphatase, AST, ALT, and albumin, BUN, creatinine
- Erythrocyte sedimentation rate (ESR)
- Screening for HIV 1, HIV 2, hepatitis B and C (HBcAb, HBsAg, HCVAb)
- Chest x-ray
- CT neck, chest, abdomen and pelvis
- PET/CT
- Bilateral bone marrow biopsies
- Multigated acquisition (MUGA) scan or echocardiogram
- Counseling: fertility, psychosocial if clinically indicated
- Lifestyle risk assessment[1]

USEFUL IN SELECTED CASES:

- Pregnancy test: women of childbearing potential
- Discuss fertility issues and sperm banking for patients of child bearing potential
- Semen cryopreservation, if chemotherapy or pelvic radiotherapy contemplated
- Cardiology consultation at baseline if risk factors for cardiac toxicity [*i.e.*, obesity, abnormal echocardiogram, hypertension (HTN), hyperlipidemia (HLD)]

See Pages 2 and 3 for Clinical Presentations and Primary Treatment

[1]See Physical Activity, Nutrition, and Tobacco Cessation algorithms; ongoing reassessment of lifestyle risks should be a part of routine clinical practice

Department of Clinical Effectiveness V5
Approved by the Executive Committee of the Medical Staff on 02/27/2018

Hodgkin's Lymphoma

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CLINICAL PRESENTATION

PRIMARY TREATMENT

Classical Hodgkin's Lymphoma Stage I-II

Classical Hodgkin's Lymphoma Stage I-II, without bulky disease

Favorable without any evidence of the following:
- Elevated ESR greater than or equal to 50 mm/hour for stages I and IIA
- Elevated ESR greater than or equal to 30 mm/hour for stages IB and IIB
- Nodal regions greater than or equal to 3[1]
- Extranodal disease[2]

→ ABVD for 2 cycles and 20 Gy of involved site radiation therapy[4]

Unfavorable[3] with any evidence of the following:
- Elevated ESR greater than or equal to 50 mm/hour for stages I and IIA
- Elevated ESR greater than or equal to 30 mm/hour for stages IB and IIB
- Nodal regions greater than or equal to 3[1]
- Extranodal disease[2]

→ ABVD for 4 cycles and 30 Gy of involved site radiation therapy[4]

Classical Hodgkin's Lymphoma Stage I-IIB, bulky disease

→
- ABVD for 6 cycles and 30 Gy of involved site radiation therapy[4]

or

- Consider ABVD for 4 cycles and 30 Gy of involved site radiation therapy[4]

→ See Page 4 for response assessment

ABVD = doxorubicin, bleomycin, vinblastine, dacarbazine

[1] See Diagram 1 on page 7 for German Hodgkin's Study Group (GHSG) Schematic of Nodal Sites
[2] Extranodal disease (*i.e.*, any tumor spread that involves tissues other than those of the lymph nodes, spleen, thymus, Waldeyer's tonsillar ring, appendix, and Peyer's patches)
[3] See Appendix A for Unfavorable Factors – risk as defined by Hasenclever's Model
[4] See Appendix B for Radiation Therapy Guideline

Continued on Next Page

Hodgkin's Lymphoma

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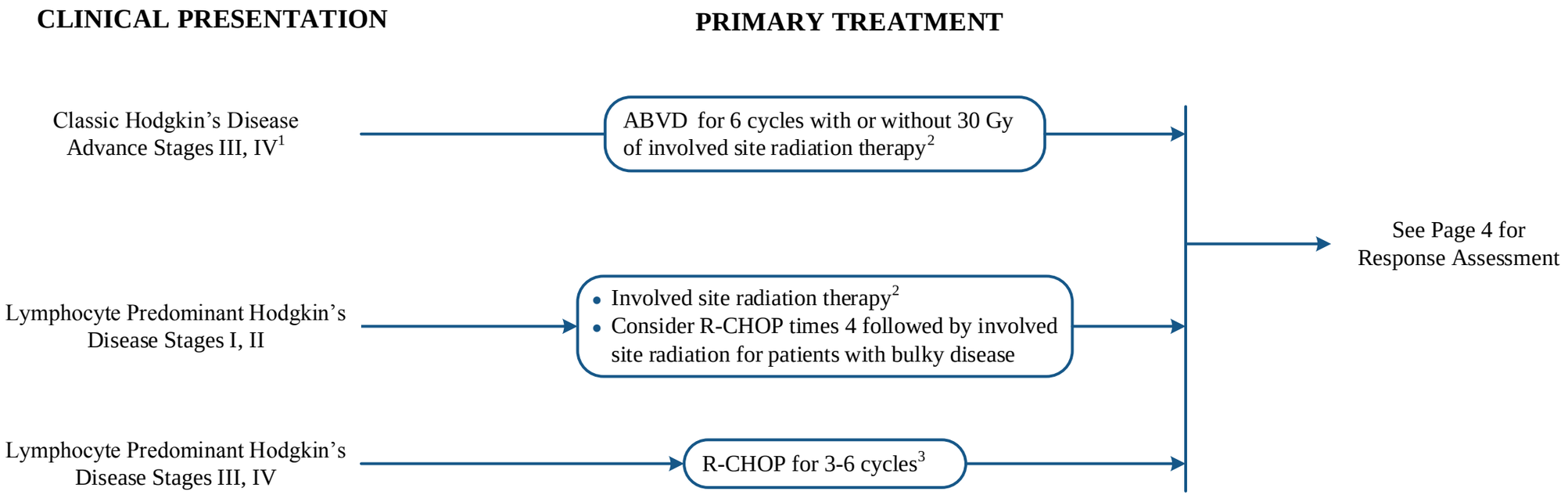
NOTE: Consider Clinical Trials as treatment options for eligible patients.



ABVD = doxorubicin, bleomycin, vinblastine, dacarbazine
R-CHOP = rituximab, cyclophosphamide, doxorubicin, vincristine, prednisone
[1] Advanced stage is consistent with an International Prognostic Score (IPS); Consider BEACOPP chemotherapy regimens for Advanced Stage Clinical Hodgkin's lymphoma
[2] See Appendix B for Radiation Therapy Guideline
[3] R-CHOP for 3-4 cycles followed by involved site radiation therapy also an option

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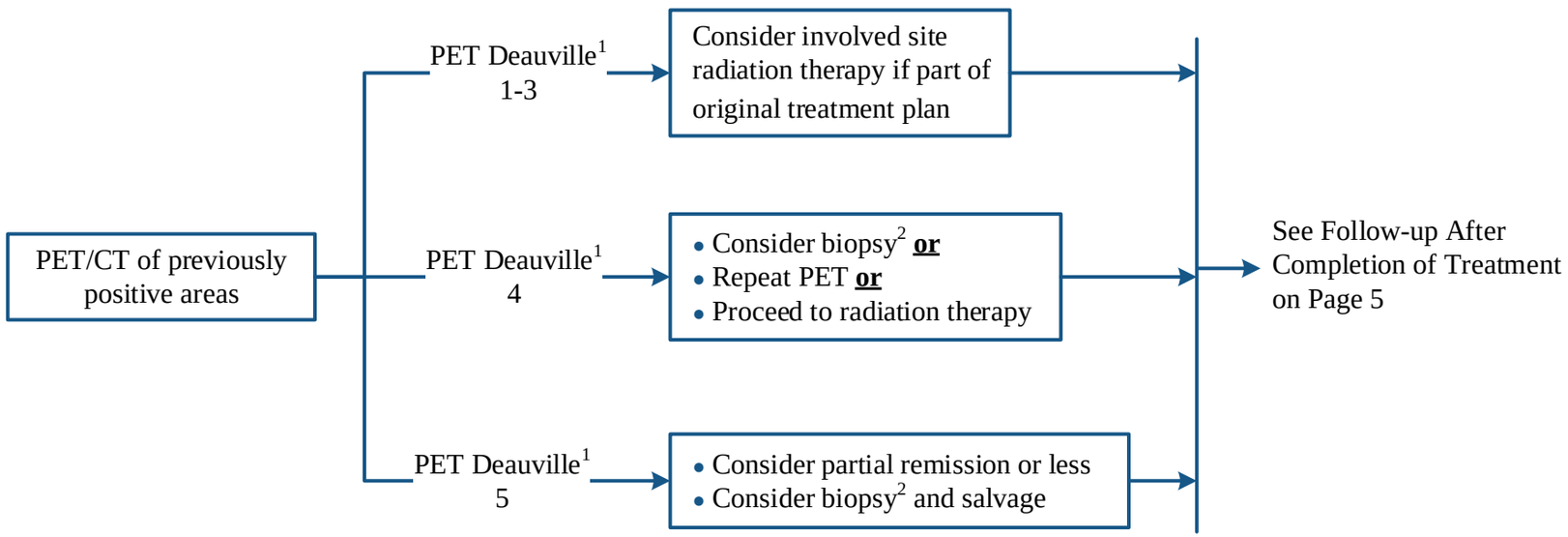
NOTE: Consider Clinical Trials as treatment options for eligible patients.

End of Therapy Response Assessment and Treatment of Classical Hodgkin's and Lymphocyte Predominant Hodgkin's



[1] See Appendix C for Deauville Criteria
[2] If biopsy positive, consider salvage treatment (See Appendix E for Chemotherapy Regimens)
If biopsy negative, observation or consider radiation

NOTE: Consider Clinical Trials as treatment options for eligible patients.

FOLLOW-UP AFTER COMPLETION OF TREATMENT

- Follow-up with an oncologist is recommended
- Interim history and physical: every 4 months for years 1 and 2, then every 6 months for years 3-5, then annually
- Pneumococcal and meningococcal revaccination every 6 years, if patient treated with splenic radiotherapy
- Annual influenza vaccine (especially if patient treated with bleomycin or chest radiotherapy)
- Laboratory studies:
  - CBC, platelets, chemistry profile (LDH, LFTs including: alkaline phosphatase, AST, ALT, albumin, BUN and creatinine) every 4 months for years 1 and 2, then every 6 months for years 3-5, then annually
  - TSH every 6 months if radiotherapy to neck and optional for all other cases
- CT chest/abdomen/pelvis 1 to 2 times during first year, then exam, chest x-ray, and labs for monitoring
- Annual breast screening: initiate alternating mammography and MRI 8 years post therapy or at age 35, whichever is sooner, if radiotherapy above diaphragm
- Counseling: reproduction, health habits, psychosocial, cardiovascular, breast self-exam, skin cancer risk, end-of-treatment discussion
- Recommend written follow-up instructions for the patient
- Stress test/echocardiogram at 10 year intervals after treatment is completed

Hodgkin's Lymphoma

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NOTE: Consider Clinical Trials as treatment options for eligible patients.

PATIENT PRESENTATION

Post-first-line therapy, chemotherapy with no radiation therapy or first-line therapy combination of chemotherapy with radiation therapy

→ Relapse or Refractory disease

→ Consider:
- ICE
- DHAP
- IGEV
- GND

SALVAGE THERAPY

Complete response[1] (CR)

→
- AHSCT[2,3] with **or** without locoregional radiation therapy
- Consider maintenance brentuximab vedotin for patients with primary refractory disease, early relapse less than 12 months or extranodal disease[4] at time of relapse if patients are not in CR at time of AHSCT or if brentuximab vedotin was given as a salvage treatment and induced remission

→ Progressive disease post AHSCT?

Yes →
- Brentuximab vedotin
- Clinical trial

No → Monitor as clinically indicated (see Page 5)

Partial response[1] (PR)

→ Consider change to a different regimen[5] including brentuximab vedotin

→ Complete response or near complete response?

Yes → (back to AHSCT[2,3] with **or** without locoregional radiation therapy)

No → Consider novel therapies on clinical protocols **or** gemcitabine-based chemotherapy regimens if not previously given

AHSCT = autologous hematopoietic stem cell transplant
DHAP = high dose cytarabine, cisplatin, and dexamethasone
GND = gemcitabine, navelbine, and doxorubicin liposomal
ICE = ifosfamide, carboplatin, and etoposide
IGEV = ifosfamide, gemcitabine, vinorelbine, and prednisone

[1] See Appendix D for Response Criteria for Malignant Lymphoma
[2] Biopsy if plan to treat with high-dose chemotherapy
[3] Conventional-dose chemotherapy may precede high-dose therapy. Sequence of therapy may vary
[4] Extranodal disease (*i.e.*, any tumor spread that involves tissues other than those of the lymph nodes, spleen, thymus, Waldeyer's tonsillar ring, appendix, and Peyer's patches)
[5] Selection of chemotherapy should be individualized

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APPENDIX A: Unfavorable Factors

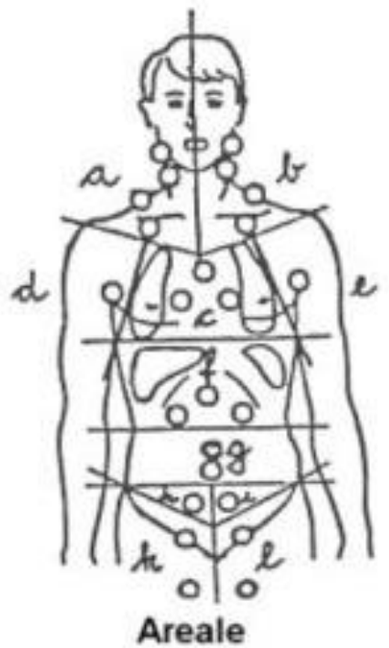
Unfavorable Factors
Localized Presentations

- Bulky mediastinal mass
- Elevated ESR greater than or equal to 50 mm/hour for stages I and IIA
- Elevated ESR greater than or equal to 30 mm/hour for stages IB and IIB
- Nodal regions greater than or equal to 3
- Extranodal disease[1]

Unfavorable Factors
Advanced Disease (International Prognostic Score)

- Albumin less than 4 g/dL
- Hemoglobin less than 10.5 g/dL
- Male
- Age greater than or equal to 45 years
- Stage IV disease
- Leukocytosis (white blood cell count at least 15 K/microliter)
- Lymphocytopenia (lymphocyte count less than 8% of white blood cell count, and/or lymphocyte count less than 0.6 K/microliter)

Diagram 1:
German Hodgkin's Study Group (GHSG) Schematic of Nodal Sites



[1] Extranodal disease (*i.e.*, any tumor spread that involves other tissues than those of the lymph nodes, spleen, thymus, Waldeyer's tonsillar ring, appendix and Peyer's patches)

APPENDIX B: Radiation Therapy Guidelines

Radiation Therapy Guidelines

Doses if radiation therapy is given alone:

- 30 Gy: Involved site
  - With consideration of IMRT or proton therapy, as appropriate, to minimize toxicity
- Bulky lesions, greater than 5 cm: consider 36 Gy to involved site

Doses for combined modality radiation therapy:

- Stage I-II non bulky disease, favorable: 20 Gy to involved site
- Stage I-II, non bulky disease, unfavorable: 30 Gy to involved site
- Stage I-II, bulky, regardless of other risk factors: 30 Gy to involved site

Salvage Radiation Therapy Guidelines when Deauville greater than or equal to 4:

- Involved site radiation dose of 40-50 Gy

RADIATION FIELDS

Involved site: involved lymphoid region(s) only

APPENDIX C: Deauville Criteria

- Score 1: no uptake
- Score 2: uptake less than or equal to mediastinum
- Score 3: uptake greater than mediastinum but less than or equal to liver
- Score 4: uptake greater than liver at any site
- Score 5: uptake greater than liver and new sites of disease
- Score X: new areas of uptake unlikely to be related to lymphoma

A score of 1-3 is regarded as negative and 4 or 5 as positive

APPENDIX D: Response Criteria for Malignant Lymphoma

Response Category	Nodal Masses	Spleen, Liver	Bone Marrow
CR (Complete Response: disappearance of all evidence of disease)	• FDG-avid or PET positive prior to therapy; mass of any size permitted if PET negative • Variably FDG-avid or PET negative; regression to normal size on CT	Not palpable, nodules disappeared	Infiltrate cleared on repeat biopsy; if indeterminate by morphology, immunohistochemistry should be negative
PR (Partial Response)	• Greater than or equal to 50% decrease in SPD of up to 6 largest dominant masses; no increase in size of other nodes • FDG-avid or PET positive prior to therapy; one or more PET positive at previously involved site • Variably FDG-avid or PET negative; regression on CT	Greater than or equal to 50% decrease in SPD of nodules (for single nodule in greatest transverse diameter); no increase in size of liver or spleen	Irrelevant if positive prior to therapy; cell type should be specified
SD (Stable disease: failure to attain CR/PR or PD)	• FDG-avid or PET positive prior to therapy; PET positive at prior sites of disease and no new sites on CT or PET • Variably FDG-avid or PET negative; no change in size of previous lesions on CT		
Relapse or Progressive disease (Any new lesion or increase by greater than or equal to 50% of previously involved sites from nadir)	• Appearance of a new lesion(s) greater than 1.5 cm in any axis, greater than or equal to 50% increase in SPD of more than one node, or greater than or equal to 50% increase in longest diameter of a previously identified node greater than 1 cm in short axis • Lesions PET positive if FDG-avid lymphoma or PET positive prior to therapy	Greater than 50% increase from nadir in the SPD of any previous lesions	New or recurrent involvement

FDG, [^{18}F] = fluorodeoxyglucose
SPD = sum of the product of the diameters

Cheson, B. D., Pfistner, B., Juweid, M. E., Gascoyne, R. D., Specht, L., Horning, S. J., ... & Rosen, S. T. (2007). Revised response criteria for malignant lymphoma. *Journal of clinical oncology*, 25(5), 579-586.

APPENDIX E: Chemotherapy Regimens for Hodgkin's Disease

ABVD: doxorubicin, bleomycin, vinblastine, and dacarbazine

ASHAP: doxorubicin, methylprednisolone, high dose cytarabine, cisplatin

BEACOPP: bleomycin, etoposide, doxorubicin, cyclophosphamide, vincristine, procarbazine, prednisone

CHOP: cyclophosphamide, doxorubicin, vincristine, prednisone

CVPP: cyclophosphamide, vincristine, procarbazine, prednisone

ICE: ifosfamide, carboplatin, and etoposide

DHAP: high dose cytarabine, cisplatin, and dexamethasone

IGEV: ifosfamide, gemcitabine, vinorelbine, and prednisone

GND: gemcitabine, navelbine and doxorubicin liposomal

SUGGESTED READINGS

Anderson, J. R., Armitage, J. O., Vose, J. M., Bierman, P., Weisenburger, D., Cunningham, D., ... Proctor, S. J. (1995). ChlVPP therapy for hodgkin's disease: Experience of 960 patients. *Annals of Oncology*, *6*(2), 167-172. doi:10.1093/oxfordjournals.annonc.a059112

Bartlett, N. L., Niedzwiecki, D., Johnson, J. L., Friedberg, J. W., Johnson, K. B., Van Besien, K., ... & Canellos, G. P. (2007). Gemcitabine, vinorelbine, and pegylated liposomal doxorubicin (GVD), a salvage regimen in relapsed Hodgkin's lymphoma: CALGB 59804. *Annals of Oncology*, 18(6), 1071-1079.

Bonadonna, G., Bonfante, V., Viviani, S., Di Russo, A., Villani, F., & Valagussa, P. (2004). ABVD plus subtotal nodal versus involved-field radiotherapy in early-stage Hodgkin's disease: long-term results. *Journal of Clinical Oncology*, 22(14), 2835-2841.

Carde, P., Burgers, J. M., Henry-Amar, M., Hayat, M., Sizoo, W., Van der Schueren, E., ... & Tanguy, A. (1988). Clinical stages I and II Hodgkin's disease: a specifically tailored therapy according to prognostic factors. *Journal of Clinical Oncology*, 6(2), 239-252.

Carde, P., Hagenbeek, A., Hayat, M., Monconduit, M., Thomas, J., Burgers, M. J., ... & Le Fur, R. (1993). Clinical staging versus laparotomy and combined modality with MOPP versus ABVD in early-stage Hodgkin's disease: the H6 twin randomized trials from the European Organization for Research and Treatment of Cancer Lymphoma Cooperative Group. *Journal of Clinical Oncology*, 11(11), 2258-2272.

Cheson, B. D., Horning, S. J., Coiffier, B., Shipp, M. A., Fisher, R. I., Connors, J. M., ... & Cabanillas, F. (1999). Report of an international workshop to standardize response criteria for non-Hodgkin's lymphomas. *Journal of clinical oncology*, 17(4), 1244-1244.

Cheson, B. D., Pfistner, B., Juweid, M. E., Gascoyne, R. D., Specht, L., Horning, S. J., ... & Rosen, S. T. (2007). Revised response criteria for malignant lymphoma. *Journal of clinical oncology*, 25(5), 579-586.

Connors, J. M. (2005). State-of-the-art therapeutics: Hodgkin's lymphoma. *Journal of clinical oncology*, 23(26), 6400-6408.

Dabaja, B. S., Rebueno, N. C., Mazloom, A., Thorne, S., Perrin, K. J., Tolani, N., ... & Horace, P. (2011). Radiation for Hodgkin's lymphoma in young female patients: a new technique to avoid the breasts and decrease the dose to the heart. *International Journal of Radiation Oncology* Biology* Physics*, 79(2), 503-507.

Diehl, V., Brillant, C., Engert, A., Mueller, R. P., Mueller-Hermelink, H. K., Hermann, R., ... & Pfistner, B. (2005). HD10: Investigating reduction of combined modality treatment intensity in early stage Hodgkin's lymphoma. Interim analysis of a randomized trial of the German Hodgkin Study Group (GHSG). *Journal of Clinical Oncology*, 23(16_suppl), 6506-6506.

Diehl, V., Franklin, J., Pfreundschuh, M., Lathan, B., Paulus, U., Hasenclever, D., ... & Dühmke, E. (2003). Standard and increased-dose BEACOPP chemotherapy compared with COPP-ABVD for advanced Hodgkin's disease. *New England Journal of Medicine*, 348(24), 2386-2395.

Diehl, V., Sieber, M., Rüffer, U., Lathan, B., Hasenclever, D., Pfreundschuh, M., ... & Tesch, H. (1997). BEACOPP: An intensified chemotherapy regimen in advanced Hodgkin's disease. *Annals of Oncology*, 8(2), 143-148.

Engert, A., Diehl, V., Franklin, J., Lohri, A., Dörken, B., Ludwig, W. D., ... & Trümper, L. (2009). Escalated-dose BEACOPP in the treatment of patients with advanced-stage Hodgkin's lymphoma: 10 years of follow-up of the GHSG HD9 study. *Journal of Clinical Oncology*, 27(27), 4548-4554.

Huang, X., Liberto, M. D., Ely, S., Jayabalan, D. S., Chen, I., Wilner, K. D., Moore, M., Niesvizky, R., & Chen-Kiang, S. (2009). Induction of sequential G1 arrest and synchronous S phase entry by reversible CDK4/CDK6 inhibition sensitizes myeloma cells for cytotoxic killing through loss of IRF-4.. *Blood*, 114(22), 299. Accessed September 18, 2017. Retrieved from http://www.bloodjournal.org/content/114/22/299.

Engert, A., Franklin, J., Eich, H. T., Brillant, C., Sehlen, S., Cartoni, C., ... & Franke, A. (2007). Two cycles of doxorubicin, bleomycin, vinblastine, and dacarbazine plus extended-field radiotherapy is superior to radiotherapy alone in early favorable Hodgkin's lymphoma: final results of the GHSG HD7 trial. *Journal of Clinical Oncology*, 25(23), 3495-3502.

Engert, A., Schiller, P., Josting, A., Herrmann, R., Koch, P., Sieber, M., ... & Willich, N. (2003). Involved-field radiotherapy is equally effective and less toxic compared with extended-field radiotherapy after four cycles of chemotherapy in patients with early-stage unfavorable Hodgkin's lymphoma: results of the HD8 trial of the German Hodgkin's Lymphoma Study Group. *Journal of Clinical Oncology*, 21(19), 3601-3608.

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SUGGESTED READINGS

Fermé, C., Eghbali, H., Meerwaldt, J. H., Rieux, C., Bosq, J., Berger, F., ... & Lederlin, P. (2007). Chemotherapy plus involved-field radiation in early-stage Hodgkin's disease. *New England Journal of Medicine*, 357(19), 1916-1927.

Gallamini, A., Hutchings, M., Avigdor, A., & Polliack, A. (2008). Early interim PET scan in Hodgkin lymphoma: where do we stand?. *Leukemia & lymphoma*, 49(4), 659-662.

Gallamini, A., Hutchings, M., Rigacci, L., Specht, L., Merli, F., Hansen, M., ... & Biggi, A. (2007). Early interim 2-[18F] fluoro-2-deoxy-D-glucose positron emission tomography is prognostically superior to international prognostic score in advanced-stage Hodgkin's lymphoma: a report from a joint Italian-Danish study. *Journal of clinical oncology*, 25(24), 3746-3752.

Gallamini, A., Rigacci, L., Merli, F., Nassi, L., Bosi, A., Capodanno, I., ... & Trentin, L. (2006). The predictive value of positron emission tomography scanning performed after two courses of standard therapy on treatment outcome in advanced stage Hodgkin's disease. haematologica, 91(4), 475-481.

Hasenclever, D., Diehl, V., Armitage, J. O., Assouline, D., Björkholm, M., Brusamolino, E., ... & Eghbali, H. (1998). A prognostic score for advanced Hodgkin's disease. *New England Journal of Medicine*, 339(21), 1506-1514.

Hutchings, M., Loft, A., Hansen, M., Pedersen, L. M., Buhl, T., Jurlander, J., ... & Berthelsen, A. K. (2006). FDG-PET after two cycles of chemotherapy predicts treatment failure and progression-free survival in Hodgkin lymphoma. *Blood*, 107(1), 52-59.

Juweid, M. E. (2006). Utility of positron emission tomography (PET) scanning in managing patients with Hodgkin lymphoma. *ASH Education Program Book*, 2006(1), 259-265.

Linch, D. C., Goldstone, A. H., McMillan, A., Chopra, R., Hudson, G. V., Winfield, D., ... & Milligan, D. (1993). Dose intensification with autologous bone-marrow transplantation in relapsed and resistant Hodgkin's disease: results of a BNLI randomised trial. *The Lancet*, 341(8852), 1051-1054.

Mauch, P., Tarbell, N., Weinstein, H., Silver, B., Goffman, T., Osteen, R., ... & Rosenthal, D. (1988). Stage IA and IIA supradiaphragmatic Hodgkin's disease: prognostic factors in surgically staged patients treated with mantle and paraaortic irradiation. *Journal of Clinical Oncology*, 6(10), 1576-1583.

Meyer, R. M., Gospodarowicz, M. K., Connors, J. M., Pearcey, R. G., Bezjak, A., Wells, W. A., ... & Djurfeldt, M. S. (2005). Randomized comparison of ABVD chemotherapy with a strategy that includes radiation therapy in patients with limited-stage Hodgkin's lymphoma: National Cancer Institute of Canada Clinical Trials Group and the Eastern Cooperative Oncology Group. *Journal of Clinical Oncology*, 23(21), 4634-4642.

Moskowitz, C. H., Nimer, S. D., Zelenetz, A. D., Trippett, T., Hedrick, E. E., Filippa, D. A., ... & Qin, J. (2001). A 2-step comprehensive high-dose chemoradiotherapy second-line program for relapsed and refractory Hodgkin disease: analysis by intent to treat and development of a prognostic model. *Blood*, 97(3), 616-623.

Moskowitz, C. H. (2012). Interim PET-CT in the management of diffuse large B-cell lymphoma. *Hematology / the Education Program of the American Society of Hematology. American Society of Hematology. Education Program*, *2012*, 397-401. doi:10.1182/asheducation-2012.1.397

National Comprehensive Cancer Network. Hodgkins Lymphoma (Version 1.2017). https://www.nccn.org/professionals/physician_gls/pdf/hodgkins.pdf. Accessed September 14, 2017

Ng, A. K., Garber, J. E., Diller, L. R., Birdwell, R. L., Feng, Y., Neuberg, D. S., ... & Mauch, P. M. (2013). Prospective study of the efficacy of breast magnetic resonance imaging and mammographic screening in survivors of Hodgkin lymphoma. *Journal of clinical oncology*, 31(18), 2282-2288.

Salloum, E., Brandt, D. S., Caride, V. J., Cornelius, E., Zelterman, D., Schubert, W., ... & Cooper, D. L. (1997). Gallium scans in the management of patients with Hodgkin's disease: a study of 101 patients. *Journal of clinical oncology*, 15(2), 518-527.

Specht, L., Yahalom, J., Illidge, T., Berthelsen, A. K., Constine, L. S., Eich, H. T., ... & Ng, A. (2014). Modern radiation therapy for Hodgkin lymphoma: field and dose guidelines from the international lymphoma radiation oncology group (ILROG). *International Journal of Radiation Oncology* Biology* Physics*, 89(4), 854-862.

Straus, D. J., Portlock, C. S., Qin, J., Myers, J., Zelenetz, A. D., Moskowitz, C., ... & Yahalom, J. (2004). Results of a prospective randomized clinical trial of doxorubicin, bleomycin, vinblastine, and dacarbazine (ABVD) followed by radiation therapy (RT) versus ABVD alone for stages I, II, and IIIA nonbulky Hodgkin disease. *Blood*, 104(12), 3483-3489.

Swerdlow, S., Campo, E., Harris, N. L., Jaffe, E. S., Pileri, S. A., Stein, H., ... & Vardiman, J. W. (2008). WHO Classification of Tumors of Hematopoietic and Lymphoid Tissues 4th Ed.(2008).

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